

قوس المثلثات III

\hat{n}

\hat{z}

\hat{z}

$$\Delta\psi = \sin\psi \Delta\psi = \frac{\Delta S}{\rho}$$

$$\Delta S = \rho \Delta\psi$$

$$\rho = \frac{\Delta S}{\Delta\psi} = \frac{ds}{d\psi}$$

$$\underline{\underline{V = V \hat{z}}}$$

$$V = \frac{ds}{dt} = \dot{S}$$

$$\underline{\underline{F = \frac{dV}{dt} = \frac{d}{dt}(\dot{S} \hat{z})}}$$

$$= \frac{dV}{dt} \hat{z} + V \left(\frac{d\hat{z}}{dt} \right)$$

$$\underline{\underline{F = \ddot{S} \hat{z} + V \frac{d\hat{z}}{dt}}}$$

$$\hat{z} = \cos\psi \hat{i} + \sin\psi \hat{j}$$

$$\frac{d\hat{z}}{dt} = \frac{d\hat{z}}{d\psi} \frac{d\psi}{dS} \frac{dS}{dt}$$

$$= \frac{V}{\rho} \frac{d\hat{z}}{d\psi} = \frac{V}{\rho} \hat{n}$$

$$\frac{d\hat{z}}{d\psi} = \sin\psi \hat{i} + \cos\psi \hat{j} = \hat{n}$$

$$\underline{\underline{F = \ddot{S} \hat{z} + \frac{V^2}{\rho} \hat{n}}}$$

$$F_t = \ddot{S} = \dot{V}$$

$$F_n = \frac{V^2}{\rho}$$

$$\underline{\underline{F = F_t \hat{z} + F_n \hat{n}}}$$

Date:

Subject:

$$V = 90 \text{ km/h}$$

Ex 12:-

$$r = 400 \text{ m}$$

Pg 25:-

$$f_t = -1.2 \text{ m/s}^2$$

Soln

$$(P) \quad F_n = \frac{V^2}{r} = \frac{(25)^2}{400} = 1.56 \text{ m/s}^2$$

$$f = \sqrt{(f_t)^2 + (f_n)^2}$$

$$= \sqrt{(-1.2)^2 + (1.56)^2} = 1.97 \text{ m/s}^2$$

$$(Q) \quad v = v_0 + at$$

$$= 25 + (-1.2)(5)$$

$$= 19 \text{ m/s}$$

$$f_n = \frac{v^2}{r} = \frac{(19)^2}{400} = 0.9025 \text{ m/s}^2$$

$$F = \sqrt{(-1.2)^2 + (0.9025)^2}$$

$$= 1.97 \text{ m/s}^2$$